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Mantodea of Iran: A review-based study

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Abstract

Scattered taxonomic data can be used to determine the geographic distribution of arthropods such as Mantodea (mantids). The distribution of mantids is not well known in Iran and not readily determined because the literature has been published in a mix of Persian-language and non-Persian-language scientific references, including books, journals, annual congress proceedings, and final reports of academic projects. To create a national checklist of mantids in Iran, I reviewed 35 Persian and non-Persian (English, German, and Italian) publications. I recorded 57 praying mantid species from 9 families described from localities across Iran. I identified 18 species—*Ameles decolor*, *Ameles heldreichi*, *Ameles picteti*, *Ameles spallanzania*, *Elaea marchali*, *Empusa pennata*, *Eremiaphila andresi*, *Eremiaphila cerisy*, *Eremiaphila turcica*, *Geomantis larvoides*, *Iris coeca*, *Iris pitcheri*, *Oxyothespis wagneri*, *Pareuthyphlebs palmonii*, *Pseudoyersinia paui*, *Rivetina baetica*, *Severinia nigrofasciata*, and *Severinia turcomaniae*—with records in Iran that may be incorrect based on geographic ranges that do not include Iran and similarity to other species that do occur in Iran. In the proposed checklist comprising 39 species, the family Rivetinidae, with 9 species, and the 2 families Amorphoscelidae and Nanomantidae, with 1 species each, comprised the greatest and least diversity, respectively. This checklist can facilitate future studies on Iran's mantodeans.

Keywords

checklist, Middle East, Persia, praying mantis

Introduction

Ancient records indicate that mantids have long been a part of human culture (Evans 2004), including humans in the Persian Plateau of Iran where mantids are depicted in ancient rock art (Kolnegari et al. 2020) and used in traditional medicine (Kolnegari pers. obs.). At 1,648,195 km^2, Iran is currently the 18th largest country and is located in the Middle East region of southwestern Asia. Iran is bordered to the north by Armenia, Azerbaijan, Turkmenistan, and the Caspian Sea; to the east by Afghanistan and Pakistan; to the south by the Gulf of Oman and the Persian Gulf; and to the west by Iraq and Turkey. About one-third of its 7,680-km boundary is seacoast (Davoudzadeh 1997).

Iran includes three climatic zones: Mediterranean to the south, arid West Asian to the east and west, and temperate humid/semi-humid Caspian zone to the north (Esmaeili et al. 2017). Several major biogeographical regions meet in this country, including the Palearctic, Eremic, and Oriental, which support a broad range of arthropod diversity (Zohary 1973, Olson et al. 2001). This includes a diversity of praying mantids that has been largely overlooked by native entomologists focused on species more important to agriculture (Kolnegari 2022).

Recently, mantid research in Iran has led to significant findings, including the identification of a new species (i.e., *Holaptilon brevipugilis* Kolnegari, 2018). This discovery highlights the potential for new discoveries resulting from more thorough taxonomic surveys in Iran. In anticipation of future taxonomic surveys, I undertook a literature review of Mantodea in Iran. Herein, I report the results, and in so doing, I provide the first checklist of the mantids of Iran.

Material and method

I reviewed the database of a national organization, the Iranian Research Institute of Plant Protection (IRIPP), which is regarded as the most important scientific organization working on arthropods in the country. The IRIPP's database consists of books, research articles, and annual congresses proceedings archived since 1946 (IRIPP 2022). I also reviewed two comprehensive books entitled Mantodea – Gottesanbeterinnen der Welt (Ehrmann 2002) and Praying Mantids; From Cognition to Conservation (Kolnegari 2022). Moreover, I used Google to search for the keywords "Mantodea", "mantis", "Iran", and "Persia" in English and Persian. I used these sources to create a national checklist of mantids in Iran. I adjusted the list to reflect current nomenclature and classification as indicated in the Mantodea Species File (Schwarz and Roy 2019, Otte et al. 2023) and in the latest relevant publications (Shcherbakov and Savitsky 2015, Villani 2020). In implementing these adjustments, I consolidated temporal and cross-language synonyms. I also documented records describing species that, if present in Iran, would be geographically highly isolated from their recognized ranges, and I identified these records as doubtful.

The global distribution of each species was assembled by consolidating the local or regional range maps provided by previous researchers (Kaltenbach 1963, Kaltenbach 1982, Ehrmann

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2002, Abu-Dannoun and Katbeh-Bader 2007, Ehrmann 2011, Kamal Mohammad et al. 2011, Caesar et al. 2015, Shcherbakov and Savitsky 2015, Akhmedov and Kholmatov 2019, Ali Panhwar et al. 2020, Villani 2020).

Results

I identified 57 species from nine families documented in 35 sources (Table 1). For around 80% of species, source material indicated a type location in a specific area, city, or province (n = 46) (Fig. 1). I consider 18 reported species—*Ameles decolor* (Charpentier, 1825), *Ameles heldreichi* Brunner von Wattenwyl, 1882, *Ameles picteti* (Saussure, 1869), *Ameles spallanzania* (Rossi, 1792), *Elaea marchali* (Reiche & Fairmaire, 1847), *Empusa pennata* (Thunberg, 1815), *Eremiaphila andresi* Werner, 1910, *Eremiaphila cerisy* Lefebvre, 1835, *Eremiaphila turcica* Westwood, 1889, *Geomantis larvoides larvoides* Pantel, 1896, *Iris coeca* Uvarov, 1931, *Iris pitcheri* Kaltenbach, 1982, *Oxyothespis wagneri* (Kittary, 1849), *Pareuthyphlebs palmonii* (Uvarov, 1939), *Pseudoyersinia paui* (Bolivar, 1898), *Rivetina baetica baetica* (Rambur, 1838), *Severinia nigrofasciata* Kaltenbach, 1982, and *Severinia turcomaniae* Saussure, 1872—as doubtful due to large separations between their recognized ranges, the locations indicated in Iran, and to their similarity to very similar species known to occur in Iran. Thus, the proposed checklist consists of 39 species with a high degree of certainty. The families Rivetinidae and Eremiaphilidae accounted for the highest number of Mantodeans in Iran (n = 9 and n = 8, respectively) (Table 2).

Table 1. Literature used in the review-based study of Iran's Mantodea.

No. / Code	Scientific publication	No. / Code	Scientific publication
1	Bagheri and Tajvand 2008	19	Mirzaee and Sadeghi 2021
2	Beier 1956	20	Mofidi-Neyestanak 2000
3	Bolivar 1911	21	Mofidi-Neyestanak 2015a
4	Bolivar 1913	22	Mofidi-Neyestanak 2015b
5	Brunner Von Wattenwyl 1878	23	Moradzadeh et al. 2021
6	Burr 1899	24	Morshedi Aghbolagh et al. 2012
7	Deeleman-Reinhold 1957	25	Rabieh et al. 2016
8	Ebner 1963	26	Ramme 1951
9	Ehrmann 2002	27	Rouhani et al. 2015
10	Ghahari and El-Den Nasser 2014	28	Sadeghi and Sadeghi 2015
11	Jamali and Mofidi-Neyestanak 2013	29	Sakenin et al. 2011
12	Kolnegari 2022	30	Samin et al. 2016
13	Kolnegari et al. 2022	31	Saussure 1870
14	Kolnegari and Vafaei-shoushtari 2018	32	Uvarov 1922
15	La Greca and Lombardo 1982	33	Uvarov 1938
16	La Greca and Lombardo 1987	34	Werner 1905
17	Mirzaee and Pashaei Rad 2017	35	Werner 1930
18	Mirzaee and Sadeghi 2019		

Table 2. Iran's Mantodea families and number of their species in the country.

Family	Number of species
Rivetinidae	9
Eremiaphilidae	8
Mantidae	6
Empusidae	4
Gonypetidae	4
Amelidae	3
Toxoderidae	3
Nanomantidae	1
Amorphoscelidae	1

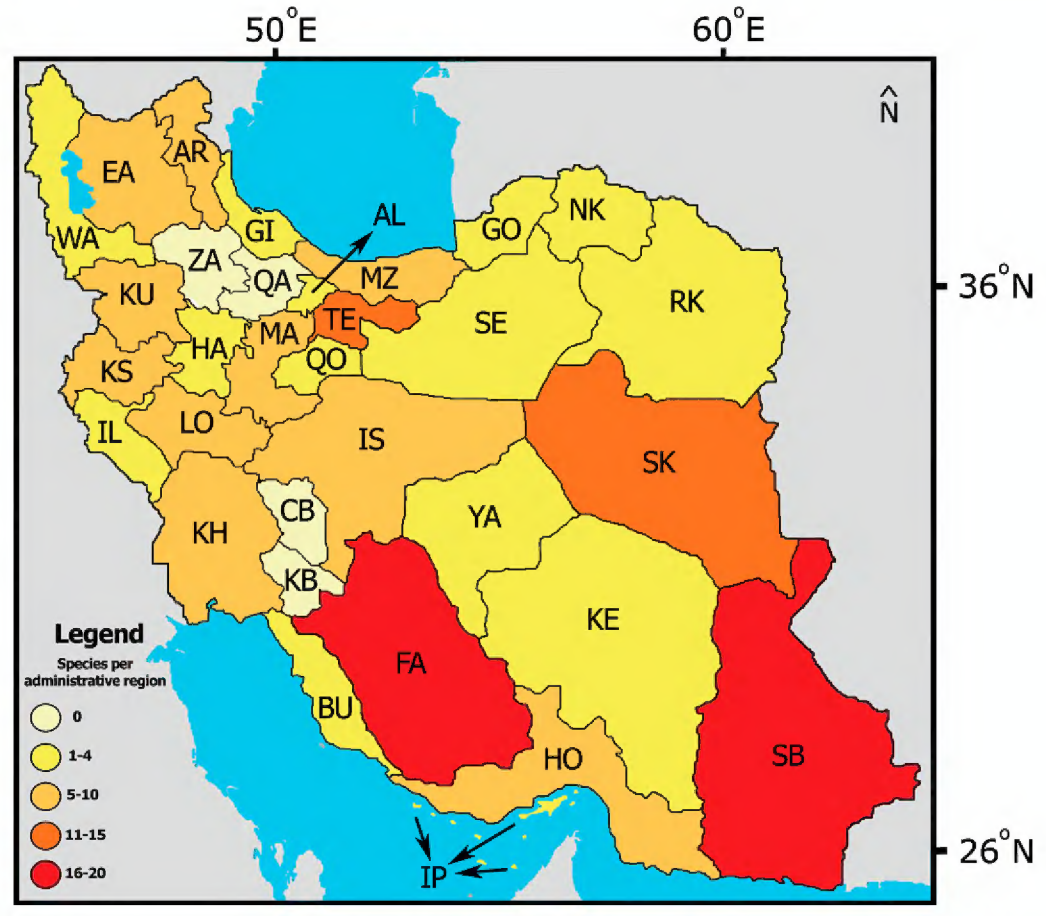

Fig. 1. Map of Iran with administrative divisions (provinces) labeled and colored to indicate the relative diversity of Mantodea species (number of identified species). Abbreviations: Alborz (AL), Ardabil (AR), Bushehr (BU), Chaharmahal and Bakhtiari (CB), East Azerbaijan (EA), Fars (FA), Golestan (GO), Hamedan (HA), Hormozgan (HO), Ilam (IL), Iranian islands of Persian Gulf (IP), Isfahan (IS), Kerman (KE), Kermanshah (KS), Khuzestan (KH), Kohgiluyeh and Boyer-Ahmad (KB), Kurdistan (KU), Lorestan (LO), Markazi (MA), Mazandaran (MZ), North Khorasan (NK), Qazvin (QA), Qom (QO), Razavi Khorasan (RK), Semnan (SE), Sistan & Baluchistan (SB), South Khorasan (SK), Tehran (TE), West Azerbaijan (WA), Yazd (YA), Zanjan (ZA).

Institutional abbreviations.—

BMNH British Museum, Natural History, London;
HMIM Hayk Mirzayans Insect Museum, Tehran;
IAUA Islamic Azad University of Arak, Markazi;
INER Istituto Nazionale di Entomologia, Rome;
MBAC Museo del Dipartimento di Biologia Animale dell'Università Catania;
MHNG Muséum d'Histoire Naturelle, Geneva;
MNMS Museo Nacional de Ciencias Naturales, Madrid;
NHMW Naturhistorisches Museum, Vienna;
NHRS Naturhistoriska Riksmuseet, Stockholm;
NHTM Natural History and Technology Museum, Shiraz University;
RMNH Nationaal Natuurhistorisch Museum, Leiden;
SMNS Staatliches Museum für Naturkunde, Stuttgart;
ZMSU Zoological Museum of Shiraz University, Fars.

Checklist of mantids of Iran

The checklist is presented following alphabetic order. The list of references referring to a species are presented under backets after the species name.

Genus *Aethalochroa* Wood-Mason, 1877

1- *Aethalochroa ashmoliana* (Westwood, 1841) [2] [9] [21]

Other names.—*Vates ashmoliana* Westwood, 1841; *Popa ashmoliana* (Westwood, 1841); *Arsacia ashmoliana* (Westwoood, 1841).

Iranian localities.—Sistan & Baluchistan Province (Iranshahr) [2].

Iranian repository.—HMIM [21].

Global distribution.—India, Iran, Pakistan, Sri Lanka, West Bengal.

Genus *Ameles* Burmeister, 1838

2- *Ameles arabica* Uvarov, 1939 [10]

Iranian localities.—Hormozgan Province (Haji-Abad) [10].

Iranian repository.—?

Global distribution.—Iran, Saudi Arabia.

3- *Ameles persa* Bolivar, 1911
[2] [3] [9] [10] [12] [17] [18] [19] [21] [25] [27] [28]
Fig. 2G

Type locality.—Khuzestan Province (Kuh-sefid, Shimbar) [3].

Type specimen.—MNMS [3].

Iranian localities.—Fars Province [19] [28]; Fars Province (Shiraz) [12]; Isfahan Province (Ardestan) [10]; Kurdistan Province [27]; Kurdistan Province (Sanandaj) [12]; Lorestan Province (Kuh-dasht) [18]; Markazi Province (Arak, Saveh, Shazand) [12]; Sistan & Baluchistan Province (Kuhe-Taftan, Makran, Sangan) [2]; South Khorasan Province [25]; Tehran Province [17].

Iranian repository.—HMIM [21]; IAUA [12]; NHTM [28]; ZMSU [18].

Global distribution.—Afghanistan, Armenia, Iran, Turkmenistan.

4- *Ameles syriensis* Giglio-Tos, 1915 [29] [30]

Iranian localities.—Ardabil Province (Meshkin-Shahr) [29]; Ilam Province (Ilam) [30].

Iranian repository.—?

Global distribution.—Iran, Jordan, Syria, Turkey.

***Amorphoscelis* Stål, 1871**

5- *Amorphoscelis pantherina* Roy, 1966 [10] [12] [19]
Fig. 2F

Iranian localities.—Hormozgan Province (Minab) [10]; Fars Province [12] [19].

Iranian repository.—?

Global distribution.—Iran, Iraq, Turkey.

***Armene* Stål, 1877**

6- *Armene pusilla* (Eversmann, 1859) [10] [21]

Other names.—*Mantis pusilla* Eversmann, 1859.

Iranian localities.—Kurdistan Province (Bijar) [10].

Iranian repository.—HMIM [21].

Global distribution.—Afghanistan, Iran, Mongolia, Russia, Tajikistan, Turkmenistan, Uzbekistan.

***Blepharopsis* Rehn, 1902**

7- *Blepharopsis mendica* (Fabricius, 1775)
[2] [9] [10] [12] [18] [19] [21] [25] [29]
Fig. 3C

Other names.—*Mantis mendica* Fabricius, 1775; *Gryllus monstrosus* Forskål, 1775; *Blepharis mendica* (Fabricius, 1775); *Mantis dilaticollis* Gistel, 1856.

Iranian localities.—Fars Province [19]; Fars Province (Khonj) [12]; Isfahan Province (Aran & Bidgol) [12]; Lorestan Province (Kuh-dasht) [18]; Markazi Province (Saveh) [12]; North Khorasan Province (Bojnurd) [29]; Qom Province (Qom) [12]; Sistan & Baluchistan Province (Bampur [10], Konarak [12], Iranshahr, Khash, Kuhe-Taftan, Makran, Sangan [2]); South Khorasan Province [25]; Tehran Province [12]; Yazd Province (Naein) [12].

Iranian repository.—HMIM [21]; ZMSU [18].

Global distribution.—Afghanistan, Algeria, Canary Islands, Chad, Cyprus, Egypt, Ethiopia, NW India, Iran, Israel, Jordan, Lebanon, Libya, Mauritania, Morocco, Niger, Oman, Pakistan, Somalia, Sudan, Tunisia, Turkey, United Arab Emirates, Uzbekistan, Yemen.

***Bolivaria* Stål, 1877**

8- *Bolivaria brachyptera* (Pallas, 1773)
[2] [6] [9] [10] [12] [17] [18] [19] [21] [23] [25] [27] [28] [29]
Fig. 2H

Other names.—*Mantis brachyptera* Pallas, 1773; *Iris brachyptera* (Pallas, 1773).

Iranian localities.—Fars Province [19] [28]; Gilan Province (Lahijan) [23]; Hamedan Province (Nahavand) [28]; Isfahan Province (Kashan [2], Khomeini Shahr [12]); Khuzestan Province (Izeh) [10]; Kurdistan Province [27]; Lorestan Province (Kuhdasht) [18]; Markazi Province (Arak, Shazand) [12]; Mazandaran Province [2]; South Khorasan Province [25]; Tehran Province [17]; Tehran Province (Ab-ali [2], Darakeh [12]); West Azerbaijan Province (Piranshahr [29], Kaboodan Island of Urmia Lake [6]).

Iranian repository.—HMIM [21]; IAUA [12]; NHTM [28]; ZMSU [18].

Global distribution.—Afghanistan, Armenia, Crete Island, Iran, Mongolia, Palestine, Russia, Turkey, Uzbekistan.

***Elaea* Stål, 1877**

9- *Elaea richteri* Beier, 1956 [2] [8] [12]
Fig. 2B

Type locality.—Sistan & Baluchistan Province (Iranshahr) [2].

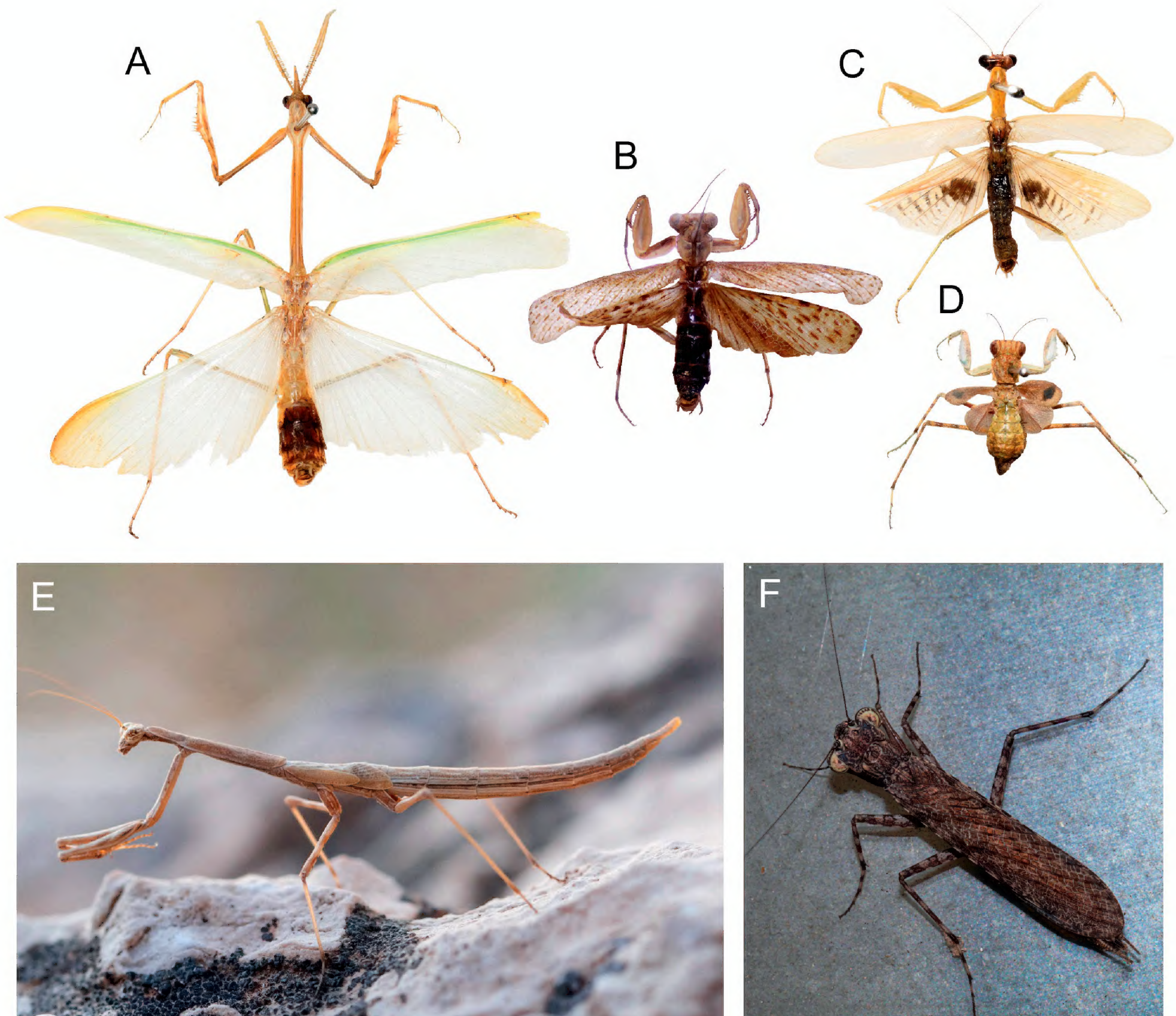

Fig. 2. Photographs of some Mantodea species identified in Iran. **A.** *Empusa pennicornis*; **B.** *Elaea richteri*; **C.** *Iris oratoria*; **D.** *Eremiaphila persica*; **E.** *Oxyothespis persica*; **F.** *Amorphoscelis pantherina*; **G.** *Ameles persa*; **H.** *Bolivaria brachyptera*; **I.** *Iris nana*. Reprinted from M. Kolnegari "Praying Mantids.—From Cognition to Conservation" (Avaye Dornaye Khakestari Institute 2022).

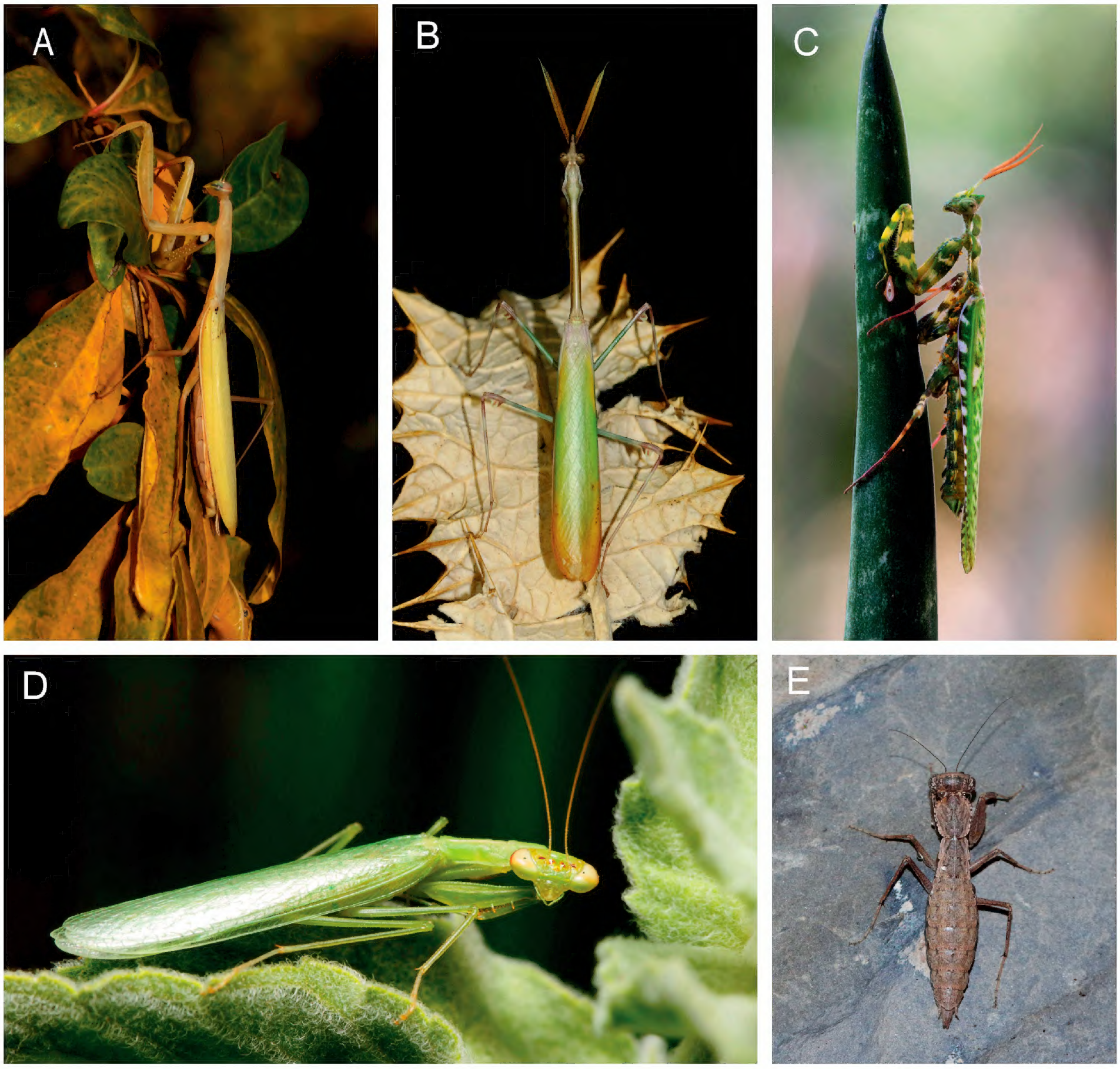

Fig. 3. Photographs of some Mantodea species identified in Iran. **A.** *Mantis religiosa*; **B.** *Empusa pennicornis*; **C.** *Blepharopsis mendica*; **D.** *Nilomantis floweri*; **E.** *Holaptilon brevipugilis*. Reprinted from M. Kolnegari "Praying Mantids.—From Cognition to Conservation" (Avaye Dornaye Khakestari Institute 2022).

Type specimen.—SMNS [2].

Iranian localities.—Sistan & Baluchistan Province (Khash [8], Konarak [12]).

Iranian repository.—IAUA [12].

Global distribution.—Iran.

Empusa Illiger, 1798

10- *Empusa fasciata* Brullé, 1832 [9] [17] [19] [21] [23] [25] [27] [29] [30]

Iranian localities.—Fars Province [19]; Gilan Province (Lahijan) [23]; Ilam Province (Darrehshahr) [30]; Kermanshah Province (Sahneh) [30]; Kurdistan Province [27]; Razavi Khorasan Province (Sarakhs) [29]; South Khorasan Province [25]; Tehran Province [17].

Iranian repository.—HMIM [21].

Global distribution.—Croatia, Cyprus, Egypt, Greece, India, Iran, Israel, Jordan, Romania, Russia, Slovenia, Turkey.

11- *Empusa hedenborgii* Stål, 1877 [2] [9] [10] [12] [17] [18]

Other names.—*Empusa stollii* Saussure, 1871.

Iranian localities.—Khuzestan Province (Ahwaz) [10]; Lorestan Province (Kuhdasht) [18]; Sistan & Baluchistan Province (Iranshahr [2], Konarak [12]); Tehran Province [17].

Iranian repository.—IAUA [12]; ZMSU [18].

Global distribution.—Cameroon, Egypt, Eritrea, Ethiopia, Iran, North Somalia, Saudi Arabia, Senegal, Sudan, United Arab Emirates, Yemen.

12- *Empusa pennicornis* Lindt, 1978
[2] [9] [10] [12] [17] [19] [20] [21] [22] [28] [29] [30]
Figs 2A, 3B

Other names.—*Mantis pennicornis* Pallas, 1773; *Gongylus marginatus* Thunberg, 1815; *Empusa orientalis* Burmeister, 1838.

Iranian localities.—Ardabil Province (Meshkin-Shahr) [29]; Fars Province [19] [28]; Ilam Province (Mehran) [30]; Iranian islands of Persian Gulf [20]; Kermanshah Province (Javanrud) [30]; Kurdistan Province (Sanandaj) [10]; Markazi Province (Arak, Farahan, Khondab, Shazand) [12]; Sistan & Baluchistan Province (Khash, Kuhe-Taftan, Saravan) [2]; South Khorasan Province [2]; Tehran Province [17]; Tehran Province (Taleghan) [12].

Iranian repository.—HMIM [20] [21] [22]; IAUA [12]; NHTM [28].

Global distribution.—Afghanistan, China, Georgia, Iran, Iraq, Kazakhstan, Russia, Tajikistan, Turkey, Turkmenistan, Ukraine, Uzbekistan.

***Eremiaphila* Lefebvre, 1835**

13- *Eremiaphila arabica* Saussure, 1871 [21]

Other names.—*Eremiaphila dawydowi* Werner, 1905.

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Egypt, Iran, Israel, Pakistan, Saudi Arabia, Yemen.

14- *Eremiaphila gene* Lefebvre, 1835 [9] [10] [25] [29]

Other names.—*Eremiaphila burmeisteri* Saussure, 1871; *Eremiaphila hauensteini* Werner, 1905.

Iranian localities.—East Azerbaijan Province (Arasbaran) [29]; Golestan Province (Gonbad) [29]; Isfahan Province (Isfahan) [10]; South Khorasan Province [25].

Iranian repository.—?

Global distribution.—Afghanistan, Armenia, Egypt, Iran, Israel, Jordan, Lebanon, Saudi Arabia, Syria, Turkey, Yemen.

15- *Eremiaphila persica persica* Werner, 1905
[2] [10] [12] [20] [21] [34]
Fig. 2D

Type locality.—Khorasan Province [34].

Type specimen.—ZMAS [34].

Iranian localities.—Iranian islands of Persian Gulf [20]; Isfahan Province (Kashan) [2]; Kerman Province (Jiroft) [10]; Markazi Province (Arak) [12]; South Khorasan Province (Birjand) [2].

Iranian repository.—HMIM [20] [21]; IAUA [12].

Global distribution.—Azerbaijan, Iran, Iraq, Turkey.

- *Eremiaphila persica sjostedti* Werner, 1930 [21] [35]

Type locality.—Bushehr Province [35].

Type specimen.—NHRS [35].

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Iran, Pakistan.

***Hierodula* Burmeister, 1838**

16- *Hierodula macrostigmata* Deeleman-Reinhold, 1957 [7]

Type locality.—Hormozgan Province (Jask) [7].

Type specimen.—RMNH [7].

Global distribution.—Iran.

17- *Hierodula tenuidentata* Saussure, 1869 [19] [29] [33]

Other names.—*Hierodula simulacrum* (Fabricius, 1793); *Sphodromantis tenuidentata* (Saussure, 1869); *Hierodula heterodera* Westwood, 1889.

Iranian localities.—Fars Province [19]; Tehran Province (Shahr-e Rey) [33].

Iranian repository.—?

Global distribution.—Afghanistan, India, Iran, Kazakhstan, Nepal, Pakistan, Tajikistan, Turkmenistan, Uzbekistan.

18- *Hierodula transcaucasica* Brunner von Wattenwyl, 1878
[2] [5] [10] [11] [12] [17] [21] [23] [24] [25] [29]

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24]; Gilan Province [2]; Gilan Province (Lahijan) [23]; Kerman Province (Jiroft) [29]; Markazi Province (Arak) [12]; Mazandaran Province (Ghaemshahr, Juybar, Namak-abrood, Ramsar, Sari) [11]; Razavi Khorasan Province (Mashhad) [10]; Sistan & Baluchistan Province (Zabol) [10]; South Khorasan Province [25]; Tehran Province [2] [17].

Type locality.—Golestan Province (Gorgan) [5].

Type specimen.—NHMW [5].

Iranian repository.—HMIM [21] [24]; IAUA [12].

Global distribution.—Armenia, Azerbaijan, Caucasus, Georgia, Iran, Russia; invasive in southern Europe.

Holaptilon Beier, 1964

19- *Holaptilon brevipugilis* Kolnegari, 2018 [12] [14]
Fig. 3E

Iranian localities.—Markazi Province (Arak) [12]; Markazi Province (Haftad-gholeh Protected Area) [14].

Iranian repository.—IAUA [12] [14].

Global distribution.—Iran.

Humbertiella Saussure, 1869

20- *Humbertiella indica* Saussure, 1869 [12]

Other names.—*Humbertiella africana* Rehn, 1912.

Iranian localities.—Sistan and Baluchistan Province (Konarak) [12].

Iranian repository.—IAUA [12].

Global distribution.—India, Iran, Myanmar, Nepal, Pakistan, Sri Lanka.

Iris Saussure, 1869

21- *Iris nana* Uvarov, 1930 [9] [12] [17] [19] [21] [33]
Fig. 2I

Other names.—*Iris radians* Uvarov, 1931.

Iranian localities.—Bushehr (Delvar) [12]; Fars Province [19]; Fars Province (Marvdasht) [33]; Semnan Province (Semnan) [12]; Sistan & Baluchistan Province (Konarak) [12]; Tehran Province [17].

Iranian repository.—HMIM [21].

Global distribution.—Afghanistan, India, Iran, Iraq, Pakistan.

22- *Iris oratoria* (Linné, 1758) [9] [12] [17] [18] [19] [21] [24] [25] [26] [27] [28] [29] [30]
Fig. 2C

Other names.—*Mantis oratorius* Linné, 1758; *Mantis minima* Charpentier, 1825.

Iranian localities.—Alborz Province (Shahrestanak) [12], Ardabil Province (Dasht-e Moghan) [24]; Fars Province [19] [28]; Kerman Province [26]; Kermanshah Province (Kermanshah) [30]; Kurdistan Province [27]; Kurdistan Province (Marivan) [12]; Lorestan Province (Kuhdasht) [18]; Markazi Province (Arak, Khondab, Shazand) [12]; North Khorasan Province (Bojnurd) [29]; South Khorasan Province [25]; Tehran Province [26] [17].

Iranian repository.—HMIM [21] [24]; IAUA [12]; NHTM [28]; ZMSU [18].

Global distribution.—Albania, Algeria, Chad, Croatia, Cyprus, Egypt, France, Greece, India, Iran, Israel, Italy, Jordan, Morocco, North America, Palestine, Spain, Syria, Tunisia, Turkey; invasive in southwestern USA.

23- *Iris persa* Uvarov, 1922 [2] [8] [21] [32]

Type locality.—Bushehr Province [32].

Type specimen.—BMNH [32].

Iranian localities.—Fars Province (Shiraz) [8]; Sistan & Baluchistan Province (Iranshahr, Khash, Kuhe-Taftan, Saravan) [2].

Iranian repository.—HMIM [21].

Global distribution.—Iran.

24- *Iris polystictica* (Fischer-Waldheim, 1846) [9] [11] [12] [17] [19] [21] [24]

Other names.—*Mantis polystictica* Fischer-Waldheim, 1846; *Iris tiflisina* Giglio-Tos, 1915.

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24]; Fars Province [19]; Tehran Province [12] [17]; Mazandaran Province (Ghaem-shahr, Juybar, Sari) [11].

Iranian repository.—HMIM [11] [21] [24].

Global distribution.—Afghanistan, Armenia, Azerbaijan, Caucasus, China, Georgia, Iran, Kazakhstan, Russia, Tajikistan, Turkey, Turkmenistan, Uzbekistan.

25- *Iris splendida* Uvarov, 1923 [10] [21] [25]

Iranian localities.—Fars Province (Shiraz) [10]; Hormozgan Province (Bandar-Abbas) [10]; South Khorasan Province [25].

Iranian repository.—HMIM [21].

Global distribution.—Afghanistan, Iran, Pakistan.

Lobothespis La Greca & Lombardo, 1987

26- *Lobothespis vignai* La Greca & Lombardo, 1987 [16]

Type locality.—Sistan & Baluchistan Province (Hamun) [16].

Type specimen.—INER [16].

Global distribution.—Iran.

Mantis Linné, 1758

27- *Mantis religiosa* Linnaeus, 1758 [1] [2] [8] [9] [10] [11] [12] [13] [17] [18] [19] [20] [21] [24] [25] [27] [28] [29] [30]
Fig. 3A

Other names.—*Gryllus religiosus* Linné, 1758; *Mantis sancta* Fabricius, 1787; *Mantis maroccana* Thunberg, 1815; *Mantis capensis* Saussure, 1872.

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24]; East Azerbaijan Province (Arasbaran) [29]; Fars Province [19] [28]; Fars Province (Kazeroon, Shiraz) [8] [10]; Hormozgan Province

(Bandar-Abbas) [10]; Ilam Province (Dehloran [10], Ilam [30]); Iranian islands of Persian Gulf [20]; Kerman Province (Manujan) [13]; Kermanshah Province (Javanrud, Kermanshah) [30]; Khuzestan Province [1]; Kurdistan Province [27]; Kurdistan Province (Bijar) [10]; Lorestan Province (Kuhdasht) [18]; Mazandaran Province [2] [12]; Mazandaran Province (Ghaem-shahr, Chalous, Juybar, Mahmood-abad, Namak-abrood, Sari, Savadkuh) [11]; Razavi Khorasan Province (Mashhad, Sabzevar) [10] [29]; South Khorasan Province [25]; Sistan & Baluchistan Province (Iranshahr) [2]; Tehran Province [12] [17]; West Azerbaijan Province (Urmia) [8] [29].

Iranian repository.—HMIM [11] [20] [21] [24]; NHTM [28]; ZMSU [18].

Global distribution.—Africa, Asia, Europe. Invasive in North America.

Microthespis Werner, 1908

28- *Microthespis dmitriewi* Werner, 1908 [2] [9] [18] [19] [21] [30]

Iranian localities.—Fars Province [19]; Kermanshah Province (Sahneh) [30]; Lorestan Province (Kuhdasht) [18]; Sistan & Baluchistan Province (Iranshahr, Saravan) [2].

Iranian repository.—HMIM [21]; ZMSU [18].

Global distribution.—Bahrain, Egypt, Ethiopia, Iran, Israel, Jordan, Oman, Pakistan, Saudi Arabia, Somalia, United Arab Emirates, Yemen.

29- *Microthespis evansi* Uvarov, 1931 [21]

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Iran, Pakistan.

Nilomantis Werner, 1907

30- *Nilomantis floweri* Werner, 1907 [9] [12] [21]
Fig. 3D

Other names.—*Cryptomantis tenella* Giglio-Tos, 1915; *Nilomantis arabica* Beier, 1930.

Iranian localities.—Fars Province [12]; Hormozgan Provincen (Gheshm) [12].

Iranian repository.—HMIM [21].

Global distribution.—Chad, Ethiopia, Iran, Mauritania, Nigeria, Oman, Saudi Arabia, Sudan, United Arab Emirates, Yemen.

Oxyothespis Saussure, 1870

31- *Oxyothespis persica* Bolivar, 1913
[2] [4] [10] [12] [18] [19] [20] [21] [22] [25]
Fig. 2E

Type locality.—Khuzestan Province (Gotvand, Shimbar) [4].

Type specimen.—MNMS [4].

Iranian localities.—Iranian islands of Persian Gulf [20]; Isfahan Province (Najaf-Abad) [10]; Fars Province [19]; Fars Province (Shiraz) [12]; Lorestan Province (Kuhdasht) [18]; Sistan & Baluchistan Province (Iranshahr, Makran) [2]; South Khorasan Province [25].

Iranian repository.—HMIM [20] [21] [22]; ZMSU [18].

Global distribution.—Iran, Pakistan.

Rivetina Berland & Chopard, 1922

32- *Rivetina caucasica caucasica* (Saussure, 1871) [9] [18] [29]

Other names.—*Iris caucasica* Saussure, 1871; *Fischeria caucasica* Saussure, 1871.

Iranian localities.—Lorestan Province (Kuhdasht) [18]; West Azerbaijan Province (Maku) [29].

Iranian repository.—ZMSU [18].

Global distribution.—Caucasus, Iran, Syria, Tajikistan, Turkey.

33- *Rivetina dolichoptera* (Schulthess-Rechberg, 1894) [2] [9]

Other names.—*Bolivaria dolichoptera* Schulthess-Rechberg, 1894; *Fischeria dolichoptera* (Schulthess-Rechberg, 1894).

Iranian localities.—Sistan & Baluchistan Province (Iranshahr, Khash, Kuhe-Taftan, Saravan) [2]; South Khorasan Province (Birjand) [2].

Iranian repository.—?

Global distribution.—Iran, Pakistan, Saudi Arabia, United Arab Emirates, Yemen.

34- *Rivetina excellens* Beier, 1956 [2]

Type locality.—Sistan & Baluchistan Province (Iranshahr) [2].

Type specimen.—SMNS [2].

Global distribution.—Iran, Iraq, United Arab Emirates, Yemen.

35- *Rivetina inermis inermis* (Uvarov, 1923) [19] [21]

Other names.—*Fischeria inermis* Uvarov, 1923.

Iranian localities.—Fars Province [19].

Iranian repository.—HMIM [21].

Global distribution.—Iran, Saudi Arabia, Yemen.

- *Rivetina inermis iranica* La Greca & Lombardo, 1982 [15]

Type locality.—Bushehr Province [15].

Type specimen.—MBAC [15].

Global distribution.—Bahrain, Iran.

- *Rivetina inermis* (not assigned to subspecies) [25] [28]

Iranian localities.—Fars Province [28]; South Khorasan Province [25].

Iranian repository.—NHTM [28].

36- *Rivetina rhombicollis* La Greca & Lombardo, 1982 [15]

Type locality.—Sistan and Baluchistan Province [15].

Type specimen.—MBAC [15], SMNS [15].

Global distribution.—Afghanistan, Iran, Pakistan.

37- *Rivetina syriaca syriaca* (Saussure, 1869) [21]

Other names.—*Iris syriaca* Saussure, 1869; *Fischeria festae* Giglio-Tos, 1916; *Eufischeriella festae* (Giglio-Tos, 1916); *Rivetina festae* (Giglio-Tos, 1916).

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Iran, Iraq, Lebanon, Syria, Tajikistan, Transcaspia, Turkey.

Sphodromantis Stål, 1871

38- *Sphodromantis trimacula* (Saussure, 1870) [31]

Other names.—*Hierodula trimacula* Saussure, 1870; *Hierodula arabica* Wood-Mason, 1882; *Sphodromantis arabica* Wood-Mason, 1882; *Sphodromantis dhufarica* Uvarov, 1933.

Type locality.—unknown.

Type specimen.—BMNH [31]; MHNG [31].

Global distribution.—Egypt, Iran, Iraq, Lebanon, Oman, Saudi Arabia, United Arab Emirates, Yemen.

39- *Sphodromantis viridis* (Forskål, 1775) [11] [12] [21] [24] [29] [30]

Other names.—*Gryllus viridis* Forskål, 1775; *Mantis guttata* Thunberg, 1815; *Mantis bioculata* Burmeister, 1838; *Hierodula bioculata* (Burmeister, 1838); *Sphodromantis bioculata* (Burmeister, 1838).

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24]; East Azerbaijan Province (Arasbaran) [29]; Fars Province (Shiraz) [12]; Kermanshah Province (Kermanshah) [30]; Mazandaran Province (Ghaem-shahr, Kelardasht, Ramsar, Sari, Savadkuh, Shirgah) [11]; Sistan and Baluchistan Province (Konarak) [12].

Iranian repository.—HMIM [11] [21] [24].

Global distribution.—Algeria, Chad, Croatia, Cyprus, Egypt, Ethiopia, Jordan, Iran, Israel, Kenya, Libya, Mauretania, Morocco, Palestine, Saudi Arabia, Senegal, Somalia, Spain, Sudan, Syria, Tanzania, Tunisia, Uganda, Yemen.

Species likely misidentified in primary literature

1- *Ameles decolor* (Charpentier, 1825) [21] [24]

Other names.—*Mantis decolor* Charpentier, 1825.

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24].

Iranian repository.—HMIM [21] [24].

Global distribution.—Albania, Algeria, Croatia, Czech Republic, France, Greece, Italy, Slovenia, Spain.

Note.—The easternmost occurrence of the species is along the northeastern coast of the Adriatic Sea. No confirmed Asian records of this species exist (Kaltenbach 1963, Agabiti et al. 2010, Villani 2020).

2- *Ameles heldreichi* Brunner von Wattenwyl, 1882 [29]

Other names.—*Parameles heldreichi* (Brunner von Wattenwyl, 1882).

Iranian localities.—East Azerbaijan Province (Arasbaran) [29].

Iranian repository.—?

Global distribution.—Cyprus, Greece, Israel, Jordan, Libya, Palestine, Turkey.

Note.—The easternmost distribution of the species includes Crimea, Central Anatolia, and the eastern Mediterranean coast.

3- *Ameles picteti* (Saussure, 1869) [10] [21]

Other names.—*Parameles picteti* Saussure, 1869; *Mantis nana* Charpentier, 1825.

Iranian localities.—Semnan Province (Shahrud) [10].

Iranian repository.—HMIM [21].

Global distribution.—Algeria, Italy, Morocco, Spain.

Note.—This species has not been recorded away from western Mediterranean coasts (Agabiti et al. 2010).

4- *Ameles spallanzania* (Rossi, 1792) [21]

Other names.—*Mantis spallanzania* Rossi, 1792; *Mantis nana* Charpentier, 1825; *Ameles abjecta* Bolivar, 1897.

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Albania, Algeria, Croatia, France, Greece, Italy, Libya, Morocco, Portugal, Spain, Tunisia.

Note.—The easternmost occurrence of this species is Cyprus (Agabiti et al. 2010).

5- *Elaea marchali* (Reiche & Fairmaire, 1847) [21]

Other names.—*Eremiaphila marchali* Reiche & Fairmaire, 1847; *Humbertiella perloides* Saussure, 1869; *Elaea perloides* (Saussure, 1869); *Elaea somalica* Schulthess-Schindler, 1898.

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Algeria, Cameroon, Egypt, Ethiopia, Guinea, Kenya, Nigeria, Senegal, Sudan.

Note.—This species is mainly found throughout the savanna regions of Northern Africa. No confirmed records of this species exist outside the Ethiopian region.

6- *Empusa pennata* (Thunberg, 1815) [2] [9] [10] [11] [21] [24]

Other names.—*Gongylus pennatus* Thunberg, 1815; *Empusa pauperata* (Fabricius, 1781); *Empusa egena* Charpentier, 1841; *Empusa brachyptera* Fischer-Waldheim, 1846.

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24]; Mazandaran Province (Ghaem-shahr, Namak-abrood, Ramsar, Savad-kuh, Shirgah) [11]; Sistan & Baluchistan Province (Iranshahr [2], Zahedan [10]).

Iranian repository.—HMIM [21].

Global distribution.—Algeria, Italy, Libya, Morocco, Spain, Tunisia.

Note.—This is a western Mediterranean species. The easternmost distribution of it includes Istria (Kaltenbach 1963).

7- *Eremiaphila andresi* Werner, 1910 [30]

Iranian localities.—Ilam Province (Darrehshahr) [30].

Iranian repository.—?

Global distribution.—Egypt, Iraq, Libya.

8- *Eremiaphila cerisy* Lefebvre, 1835 [9]

Iranian localities.—unknown.

Iranian repository.—?

Global distribution.—Egypt, Iraq, Oman, Saudi Arabia, United Arab Emirates.

9- *Eremiaphila turcica* Westwood, 1889 [9]

Iranian localities.—unknown.

Iranian repository.—?

Global distribution.—Iraq, Turkey.

10- *Geomantis larvoides larvoides* Pantel, 1896 [29]

Other names.—*Fischeria baetica* Pantel, 1886.

Iranian localities.—Gilan Province (Astara) [29].

Iranian repository.—?

Global distribution.—Albania, Croatia, France, Greece, Italy, Morocco, North Africa, Portugal, Spain, Tunisia, Turkey.

Note.—This species has not been recorded away from Mediterranean coasts.

11- *Iris coeca* Uvarov, 1931 [10] [21]

Iranian localities.—Ilam Province (Dehloran) [10].

Iranian repository.—HMIM [21].

Global distribution.—Egypt, Saudi Arabia, Sudan, Yemen.

12- *Iris pitcheri* Kaltenbach, 1982 [21]

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Saudi Arabia.

13- *Oxyothespis wagneri* (Kittary, 1849) [9]

Other names.—*Mantis wagneri* Kittary, 1849.

Iranian localities.—unknown.

Iranian repository.—?

Global distribution.—Afghanistan, Kazakhstan.

14- *Pareuthyphlebs palmonii* (Uvarov, 1939) [21]

Other names.—*Xenomantis palmonii* Uvarov, 1939.

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Israel, Jordan, Palestine.

Note.—Distribution of the species is limited to distinct regions of the Middle East along Mediterranean coasts.

15- *Pseudoyersinia paui* (Bolivar, 1898) [24]

Other names.—*Ameles paui* Bolivar, 1898; *Parameles paui* (Villani 2020).

Iranian localities.—Ardabil Province (Dasht-e Moghan) [24].

Iranian repository.—HMIM [24].

Global distribution.—Spain.

Note.—This species has been recorded only in Spain.

16- *Rivetina baetica baetica* (Rambur, 1838) [12] [21] [22] [29]

Other names.—*Mantis baetica* Rambur, 1838; *Mantis fasciata* Thunberg, 1815; *Fischeria baetica* (Rambur, 1838).

Iranian localities.—East Azerbaijan Province (Arasbaran) [29]; Markazi Province (Arak, Farahan) [12].

Iranian repository.—HMIM [21] [22]; IAUA [12].

Global distribution.—Algeria, Chad, Egypt, Italy, Libya, Malta, Mauritania, Morocco, Senegal, Spain, Tunisia.

Note.—This species mainly occurs in Northern Africa and Southern Europe (La Greca and Lombardo 1982).

17- *Severinia nigrofasciata* Kaltenbach, 1982 [21]

Iranian localities.—unknown.

Iranian repository.—HMIM [21].

Global distribution.—Saudi Arabia.

18- *Severinia turcomaniae* Saussure, 1872 [28]

Other names.—*Oxythespis turcomaniae* Saussure, 1872.

Iranian localities.—Fars Province [28].

Iranian repository.—NHTM [28].

Global distribution.—Mongolia, Turkestan.

Discussion

This study demonstrates the potential significance of Iranian repositories for future investigations. However, to validate the primary identification of Iranian repositories, the specimens need to be properly preserved. Unfortunately, some have been poorly preserved in local institutions where they are prone to accidental destruction or loss (Kolnegari pers. obs.). The Hayk Mirzayans Insect Museum (HMIM) has solved these problems by limiting access to voucher specimens. This ensures conservation of the largest insect collection of Iran with over four million specimens (IRIPP 2022) but simultaneously creates a challenge to documenting the history and distribution of mantids in Iran. At least 35 mantid specimens likely housed in the HMIM should be included in future study of the Mantodea of Iran.

Although the number of mantids documented in Iran is relatively small to date (i.e., approximately 2% of globally identified mantids), the large size of the country and the relative paucity of information on its invertebrate community make it likely that Iran contains undocumented mantid taxa. This is particularly true of the western half of Iran where two main mountain ranges (Alborz and Zagros) have been described as cradles of unique floristic and faunistic diversity (Zohary 1973, Esmaeili et al. 2017). Systematic surveys appear to have never occurred in four provinces in western Iran, including Chaharmahal and Bakhtiari, Kohgiluyeh and Boyer-Ahmad, Qazvin, and Zanjan (Fig. 1). Moreover, each of the 17 known ecoregions of Iran—particularly marginal ecoregions—could be highly important from a zoogeographical perspective (Olson et al. 2001), but they were not considered in previous studies. Therefore, conducting systematic surveys in mantid habitats in the unexplored provinces and in all ecoregions of Iran could lead to taxonomically and faunistically significant achievements.

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